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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/817,330

03/26/2001

Phillip C. Celaya

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8912

7590

07/07/2004

Robert D. Atkins
ON Semiconductor
Patent Administration Dept - MD A230
P.O. Box 62890
Phoenix, AZ 85082-2890

EXAMINER

PHAN, THIEM D

ART UNIT

PAPER NUMBER

3729

DATE MAILED: 07/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/817,330

Applicant(s)

CELAYA ET AL.

Examiner

Tim Phan

Art Unit

3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. In view of the Appeal Brief filed on 4/26/04, PROSECUTION IS HEREBY REOPENED. A new² ground of rejection based on newly found art is set forth below.

To avoid abandonment of the application, appellants must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 19-24, 28 and 31-37 are rejected under 35 U.S.C. 102(e) as being anticipated by Yano et al (US 6,046,499) hereinafter '499.

As applied to claim 19, the '499 teaches a process of producing a semiconductor package (Cf. Fig. 2, 32), comprising a step of plating (Cf. Col. 7, lines 25 ff.) a conductive material to project outwardly from a second surface (Cf. Fig. 2, 25) of a substrate (Cf. Fig. 2, 13) to form a lead-free first lead (Cf. Fig. 2, 27; col. 7, lines 24 ff.) of the integrated circuit (Cf. Fig. 2, 1).

As applied to claim 20, the '499 teaches a step of mounting a semiconductor die (Cf. Fig. 2, 1) to a first surface (Cf. Fig. 2, 17) of the substrate (Cf. Fig. 2, 13).

As applied to claim 21, the '499 teaches a step of forming a signal path (Cf. Fig. 2, 19 & 31) on the first surface (Cf. Fig. 2, 17) with the conductive material.

As applied to claim 22, the '499 teaches a further step of disposing the conductive material in a via (Cf. Fig. 2, 31; col. 6, lines 63-65) defined by the substrate (Cf. Fig. 2, 13) to extend the signal path from the first surface (Cf. Fig. 2, 17) to the second surface (Cf. Fig. 2, 25) of the substrate.

As applied to claim 23, the '499 teaches a further step of disposing the conductive material on the second surface (Cf. Fig. 2, 25) to extend the signal path from the via (Cf. Fig. 2, 31) to the lead-free first lead (Cf. Fig. 2, 27; col. 7, lines 24 & 25).

As applied to claim 24, the '499 teaches a step of disposing the conductive material on the second surface (Cf. Fig. 2, 25) includes the step of forming an access pad (Cf. Col. 4, lines 50 & 51) on the second surface.

As applied to claim 28, the '499 teaches a further step of wire bonding (Cf. Fig. 2, 21) the signal path to a node of the semiconductor die (Cf. Fig. 2, 1) to couple a signal between the node and the lead-free first lead (Cf. Fig. 2, 19; col. 7, lines 6-9).

As applied to claim 31, the '499 teaches a step of plating a bump (Cf. Fig. 2, 27; col. 7, lines 24 ff.) of the conductive material in an outward direction for routing a current through the lead-free first lead (Cf. Fig. 2, 27) that flows parallel to the outward direction of the vias (Cf. Fig. 2, 31).

As applied to claim 32, the '499 teaches a process of producing a semiconductor package (Cf. Fig. 2, 32), comprising the steps of:

- providing a package substrate (Cf. Fig. 2, 13) having a first surface (Cf. Fig. 2, 17) for mounting a semiconductor die (Cf. Fig. 2, 1); and
- plating a bump of conductive material (Cf. Fig. 2, 27; col. 7, lines 24 ff.) to extend outwardly from a second surface (Cf. Fig. 2, 25) of the substrate to form a lead-free lead (Cf. Fig. 2, 27) of the integrated circuit (Cf. Fig. 2, 32).

As applied to claim 33, the '499 teaches a step of plating a bump of conductive material (Cf. Fig. 2, 27; col. 7, lines 24 ff.) that includes the step of disposing the conductive material to a height for attaching the lead to a mounting surface of a PCB (Cf. Fig. 2, 15).

As applied to claim 34, the '499 teaches a step of disposing the bump (Cf. Fig. 2, 27) of conductive material to the height of 0.9 millimeters.

As applied to claim 35, the '499 teaches a step of forming the lead to a height that maintains a spacing between the substrate (Cf. Fig. 2, 13) and the motherboard (Cf. Fig. 2, 15).

As applied to claim 36, the '499 teaches a process of producing a semiconductor package (Cf. Fig. 2, 32), comprising the steps of:

- mounting a semiconductor die (Cf. Fig. 2, 1) to a first surface (Cf. Fig. 2, 17) of a substrate (Cf. Fig. 2, 13);
- disposing a conductive material (Cf. Fig. 2, 19) along the first surface (Cf. Fig. 2, 17) and through a via (Cf. Fig. 2, 31; col. 6, lines 63-65) of the substrate to form a signal path of the integrated circuit between the first (Cf. Fig. 2, 17) and a second surface (Cf. Fig. 2, 25) of the substrate; and
- plating the conductive material on the second surface (Cf. Fig. 2, 25) to form a lead-free lead (Cf. Fig. 2, 27; col. 7, lines 24 ff.) of the integrated circuit (Cf. Fig. 2, 1) that is electrically coupled to the signal path (Cf. Fig. 2, 19 & 31).

As applied to claim 37, the '499 teaches a step of plating a bump (Cf. Fig. 2, 27; col. 7, lines 24 ff.) of conductive material to project outwardly from the second surface (Cf. Fig. 2, 25).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 25-27, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the '499.

As applied to claims 25-27 and 29, the '499 teaches the claimed invention, including the step of plating a bump (Cf. Fig. 2, 27; col. 7, lines 25-27) of conductive material on the access pads (Cf. col. 4, line 51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to pattern an opening in the photoresist or solder mask to access the pad, since it was known in the art that a bump is plated at the exposed pad (Cf. Fig. 2, 27; col. 4, line 51; col. 7, lines 25-27).

As applied to claim 30, the '499 teaches the claimed invention, except for forming the solder mask after plating.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the solder mask after plating in order to protect any exposed track on the second surface (Cf. Fig. 2, 25) of the semiconductor package.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tim Phan whose telephone number is 703-605-0707. The examiner can normally be reached on Monday - Friday, 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter VO can be reached on 703-308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1148.

Tim Phan
Examiner
Art Unit 3729

tp
July 7, 2004



A. DEXTER TUGBANG
PRIMARY EXAMINER